

```
<110> PODBIELSKI, Andreas
<120> COLLAGEN BINDING PROTEINS FROM STREPTOCOCCUS PYOGENES
<130> P06628US0/BAS
<140> US 09/494,297
<141> 2000-01-31
<160> 32
<170> PatentIn version 3.1
<210> 1
<211> 2274
<212> DNA
<213> Streptococcus pyogenes
<400> 1
atgaaaaaaa caaggtttcc aaataagctt aatactctta atactcaaag ggtattaagt 60
aaaaactcaa aacgatttac tgtcacttta gtgggagtct ttttaatgat cttcgctttg 120
gtaacttcca tggttggtgc taagactgtt tttggtttag tagaatcctc gacgccaaac 180
gcaataaatc cagattcaag ttcggaatac agatggtatg gatatgaatc ttatgtaaga 240
gggcatccat attataaaca gtttagagta gcacacgatt taagggttaa cttagaagga 300
agtagaagtt atcaagttta ttgctttaat ttaaagaaag catttcctct cggatcagat 360
agtagtgtta aaaagtggta taaaaaacat gatggaatct ctacaaaatt tgaagattat 420
gcgatgagcc ctagaattac gggagatgag ctaaatcaga agttacgagc tgttatgtat 480
aatggacatc cacaaaatgc caatggtatt atggaaggct tggaaccctt gaatgctatc 540
agagttacac aagaggcggt atggtactat tctgataatg ctcctatttc taatccagat 600
gaaagtttta aaagggagtc agaaagtaac ttggttagta cttctcaatt atctttgatg 660
cqtcaaqctt tqaaqcaact qattqatccq aatttqqcaa ctaaaatqcc aaaacaaqtt 720
ccqqatqatt ttcaqctaaq tatttttqaq tctqaqqaca aqqqaqataa atataataaa 780
ggataccaaa atcttttgag tggtggttta gttcctacta aaccaccaac tccaggagac 840
ccaccaatgc ctccaaatca acctcaaacg acttcagtac ttattagaaa gtatgctata 900
ggtgattact ctaaattgct tgaaggtgca acattacagt tgacagggga taacgtgaat 960
agttttcaag cgagagtgtt tagcagtaat gatattggag aaagaattga actatcagat 1020
ggaacttata ctttaactga attgaattct ccagctggtt atagtatcgc agagccaatc 1080
acttttaagg ttgaagctgg caaagtgtat actattattg atggaaaaca gattgaaaat 1140
cccaataaag agatagtaga gccttactca gtagaagcat ataatgattt tgaagaattt 1200
agcgttttaa ctacacaaaa ctatgcaaaa ttttattatg caaaaaataa aaatggaagt 1260
tcacaggttg tctattgctt taatgcagat ctaaaatctc caccagactc tgaagatggt 1320
gggaaaacaa tgactccaga ctttacaaca ggagaagtaa aatacactca tattgcaggt 1380
cgtgacctct ttaaatatac tgtgaaacca agagataccg atcctgacac tttcttaaaa 1440
catatcaaaa aagtaattga gaagggttac agggaaaaaag gacaagctat tgagtatagt 1500
ggtctaactg agacacaatt gcgtgcggct actcagttag caatatatta tttcactgat 1560
agtgctgaat tagataagga taaactaaaa gactatcatg gttttggaga catgaatgat 1620
agtactttag cagttgctaa aatccttgta gaatacgctc aagatagtaa tcctccacag 1680
ctaactqacc ttgatttctt tattccgaat aacaataaat atcaatctct tattggaact 1740
cagtggcatc cagaagattt agttgatatt attcgtatgg aagataaaaa agaagttata 1800
cctgtaactc ataatttaac attgagaaaa acggtgactg gtttagctgg tgacagaact 1860
aaagatttcc attttgaaat tgaattaaaa aataataagc aagaattgct ttctcaaact 1920
gttaaaacaq ataaaacaaa cctcgaattt aaaqatggta aagcaaccat taatttaaaa 1980
catqqqqaaa qtttaacact tcaaqqttta ccaqaaqqtt attcttacct tqtcaaaqaa 2040
acagattctg aaggctataa ggttaaagtt aatagccaag aagtagcaaa tgctacagtt 2100
tcaaaaacag gaataacaag tgatgagaca cttgcttttg aaaataataa agagcctgtt 2160
```

gttcctacag gagttgatca aaagatcaat ggctatctag ctttgatagt tatcgctggt 2220 atcagtttgg ggatctgggg aattcacacg ataaggataa gaaaacatga ctag 2274

<210> 2

<211> 757

<212> PRT

<213> Streptococcus pyogenes

<400> 2

Met Lys Lys Thr Arg Phe Pro Asn Lys Leu Asn Thr Leu Asn Thr Gln 1 5 10 15

Arg Val Leu Ser Lys Asn Ser Lys Arg Phe Thr Val Thr Leu Val Gly
20 25 30

Val Phe Leu Met Ile Phe Ala Leu Val Thr Ser Met Val Gly Ala Lys 35 40 45

Thr Val Phe Gly Leu Val Glu Ser Ser Thr Pro Asn Ala Ile Asn Pro 50 55 60

Asp Ser Ser Ser Glu Tyr Arg Trp Tyr Gly Tyr Glu Ser Tyr Val Arg 65 70 75 80

Gly His Pro Tyr Tyr Lys Gln Phe Arg Val Ala His Asp Leu Arg Val 85 90 95

Asn Leu Glu Gly Ser Arg Ser Tyr Gln Val Tyr Cys Phe Asn Leu Lys 100 105 110

Lys Ala Phe Pro Leu Gly Ser Asp Ser Ser Val Lys Lys Trp Tyr Lys
115 120 125

Lys His Asp Gly Ile Ser Thr Lys Phe Glu Asp Tyr Ala Met Ser Pro 130 135 140

Arg Ile Thr Gly Asp Glu Leu Asn Gln Lys Leu Arg Ala Val Met Tyr 145 150 155 160

Asn Gly His Pro Gln Asn Ala Asn Gly Ile Met Glu Gly Leu Glu Pro 165 170 175

Leu Asn Ala Ile Arg Val Thr Gln Glu Ala Val Trp Tyr Tyr Ser Asp 180 185 190

Asn Ala Pro Ile Ser Asn Pro Asp Glu Ser Phe Lys Arg Glu Ser Glu
195 200 205

Ser Asn Leu Val Ser Thr Ser Gln Leu Ser Leu Met Arg Gln Ala Leu 210 215 220

Lys Gln Leu Ile Asp Pro Asn Leu Ala Thr Lys Met Pro Lys Gln Val 225 230 235 240

Pro Asp Asp Phe Gln Leu Ser Ile Phe Glu Ser Glu Asp Lys Gly Asp 245 250 255

Lys Tyr Asn Lys Gly Tyr Gln Asn Leu Leu Ser Gly Gly Leu Val Pro 260 265 270

Thr Lys Pro Pro Thr Pro Gly Asp Pro Pro Met Pro Pro Asn Gln Pro 275 280 285

Gln Thr Thr Ser Val Leu Ile Arg Lys Tyr Ala Ile Gly Asp Tyr Ser 290 295 300

Lys Leu Leu Glu Gly Ala Thr Leu Gln Leu Thr Gly Asp Asn Val Asn 305 310 . 315 320

Ser Phe Gln Ala Arg Val Phe Ser Ser Asn Asp Ile Gly Glu Arg Ile 325 330 335

Glu Leu Ser Asp Gly Thr Tyr Thr Leu Thr Glu Leu Asn Ser Pro Ala 340 345 350

Gly Tyr Ser Ile Ala Glu Pro Ile Thr Phe Lys Val Glu Ala Gly Lys 355 360 365

Val Tyr Thr Ile Ile Asp Gly Lys Gln Ile Glu Asn Pro Asn Lys Glu 370 375 380

Ile Val Glu Pro Tyr Ser Val Glu Ala Tyr Asn Asp Phe Glu Glu Phe 385 390 395 400

Ser Val Leu Thr Thr Gln Asn Tyr Ala Lys Phe Tyr Tyr Ala Lys Asn 405 410 415

Lys Asn Gly Ser Ser Gln Val Val Tyr Cys Phe Asn Ala Asp Leu Lys 420 425 430

Ser Pro Pro Asp Ser Glu Asp Gly Gly Lys Thr Met Thr Pro Asp Phe
435
440
445

Thr Thr Gly Glu Val Lys Tyr Thr His Ile Ala Gly Arg Asp Leu Phe 450 455 460

Lys Tyr Thr Val Lys Pro Arg Asp Thr Asp Pro Asp Thr Phe Leu Lys 465 470 475 480

His Ile Lys Lys Val Ile Glu Lys Gly Tyr Arg Glu Lys Gly Gln Ala 485 490 495

Ile Glu Tyr Ser Gly Leu Thr Glu Thr Gln Leu Arg Ala Ala Thr Gln 500 505 510

Leu Ala Ile Tyr Tyr Phe Thr Asp Ser Ala Glu Leu Asp Lys 515 520 525

Leu Lys Asp Tyr His Gly Phe Gly Asp Met Asn Asp Ser Thr Leu Ala 530 535 540

Val Ala Lys Ile Leu Val Glu Tyr Ala Gln Asp Ser Asn Pro Pro Gln 545 550 555 560

```
Leu Thr Asp Leu Asp Phe Phe Ile Pro Asn Asn Asn Lys Tyr Gln Ser
                565
                                    570
Leu Ile Gly Thr Gln Trp His Pro Glu Asp Leu Val Asp Ile Ile Arg
Met Glu Asp Lys Lys Glu Val Ile Pro Val Thr His Asn Leu Thr Leu
                            600
Arg Lys Thr Val Thr Gly Leu Ala Gly Asp Arg Thr Lys Asp Phe His
                        615
                                            620
Phe Glu Ile Glu Leu Lys Asn Asn Lys Gln Glu Leu Leu Ser Gln Thr
                    630
                                         635
Val Lys Thr Asp Lys Thr Asn Leu Glu Phe Lys Asp Gly Lys Ala Thr
                645
                                     650
Ile Asn Leu Lys His Gly Glu Ser Leu Thr Leu Gln Gly Leu Pro Glu
                                665
Gly Tyr Ser Tyr Leu Val Lys Glu Thr Asp Ser Glu Gly Tyr Lys Val
                            680
Lys Val Asn Ser Gln Glu Val Ala Asn Ala Thr Val Ser Lys Thr Gly
                                            700
    690
                        695
Ile Thr Ser Asp Glu Thr Leu Ala Phe Glu Asn Asn Lys Glu Pro Val
                    710
                                         715
Val Pro Thr Gly Val Asp Gln Lys Ile Asn Gly Tyr Leu Ala Leu Ile
Val Ile Ala Gly Ile Ser Leu Gly Ile Trp Gly Ile His Thr Ile Arg
            740
                                745
Ile Arg Lys His Asp
        755
<210> 3
<211> 2229
<212> DNA
<213> Streptococcus pyogenes
<400> 3
ttqcaaaaqa qqqataaaac caattatgqa agcgctaaca acaaacgacg acaaacgacg 60
atcggattac tgaaagtatt tttgacgttt gtagctctga taggaatagt agggttttct 120
atcagagegt teggagetga agaacaatca gtaccaaata gacaaagete aattcaagat 180
tatccgtggt atggctatga ttcttatcct aaaggctacc cagactatag tccgttaaag 240
acttaccata atttaaaagt aaatttagag ggaagtaagg attatcaagc atactgcttt 300
aatttaacaa aacattttcc atccaagtca gatagtgtta gatcacaatg gtataaaaaa 360
cttgaaggaa ctaatgaaaa ctttatcaag ttagcagata aaccaagaat agaagacgga 420
cagttacaac aaaatatatt gaggattete tataatggat ateetaataa tegtaatggg 480
ataatgaaag ggatagatcc tctaaacgct attttagtga ctcaaaatgc tatttggtat 540
actgattcag ctcaaattaa tccggatgaa agttttaaaa cagaagctcg aagtaatggt 600
attaatqacc agcagttagg cttaatgcga aaagctttaa aagaactaat tgatccaaac 660
```

```
ttagggtcaa aatattcgaa taaaactcca tcaggttatc ggttaaatgt atttgaatct 720
catgataagc ctttccaaaa tcttttgagt gctgagtatg ttccggatac tcccccaaaa 780
ccaggagaag agcctccggc taaaactgaa aaaacatcag tcattatcag aaaatatgcg 840
gaaggtgact ctaaacttct agagggagca accttaaagc tttctcaaat tgaaggaagt 900
ggttttcaag aaaaagactt tcaaagtaat agtttaggag aaactgtcga attaccaaat 960
gggacttata ccttaacaga aacatcatct ccagatggat ataaaattgc ggaqccgatt 1020
aagtttagag tagagaataa aaaagtattt atcgtccaaa aagatggttc tcaagtggaa 1080
aatccaaaca aagaagtagc agagccatac tcagtggaag cgtataatga ctttatggat 1140
gaagaagtac tctcgggttt tactccatac ggaaaattct attacgctac aaataaggat 1200
aaaagttcac aagttgtcta ctgcttcaat gctgatttac actcaccacc tgactcatat 1260
gatagtggtg agactataaa tccagatact agtacgatga aagaagtcaa gtacacacat 1320
acggcaggta gtgacttgtt taaatatgcg ctaagaccga gagatacaaa tccagaagac 1380
ttcttaaagc acattaaaaa agtaattgaa aaaggctaca agaaaaaagg tgatagctat 1440
aatggattaa cagaaacaca gtttcgcgcg gctactcagc ttgctatcta ttattttaca 1500
gacagtgctg acttaaaaac cttaaaaact tataacaatg ggaaaggtta ccatggattt 1560
gaatctatgg atgaaaaaac cctagctgtc acaaaagaat taattactta tgctcaaaat 1620
ggcagtgccc ctcaactaac aaatcttgat ttcttcgtac ctaataatag caaagaccaa 1680
tetettattg ggacagaatg ceatecagat gatttggttg aegtgatteg tatggaagat 1740
aaaaagcaag aagttattcc agtaactcac agtttgacag tgaaaaaaac agtagtcggt 1800
gagttgggag ataaaactaa aggcttccaa tttgaacttg agttgaaaga taaaactgga 1860
cagcctattg ttaacactct aaaaactaat aatcaagatt tagtagctaa agatgggaaa 1920
tattcattta atctaaagca tggtgacacc ataagaatag aaggattacc gacgggatat 1980
tettataete tgaaagagge tgaagetaag gattatatag taacegttga taacaaagtt 2040
agtcaagaag cgcagtcagt aggtaaggat ataacagaag acaaaaaagt cacttttgaa 2100
aaccgaaaag atcttgtccc accaactggt ttgacaacag atggggctat ctatctttgg 2160
ttgttattac ttgttccact tgggttattg gtttggctat ttggtcgtaa agggttaaaa 2220
aatqactaa
<210> 4
<213> Streptococcus pyogenes
<400>4
Met Gln Lys Arg Asp Lys Thr Asn Tyr Gly Ser Ala Asn Asn Lys Arg
```

```
<211> 742
<212> PRT
```

Arg Gln Thr Thr Ile Gly Leu Leu Lys Val Phe Leu Thr Phe Val Ala

Leu Ile Gly Ile Val Gly Phe Ser Ile Arg Ala Phe Gly Ala Glu Glu

Gln Ser Val Pro Asn Arg Gln Ser Ser Ile Gln Asp Tyr Pro Trp Tyr 50

Gly Tyr Asp Ser Tyr Pro Lys Gly Tyr Pro Asp Tyr Ser Pro Leu Lys

Thr Tyr His Asn Leu Lys Val Asn Leu Glu Gly Ser Lys Asp Tyr Gln

Ala Tyr Cys Phe Asn Leu Thr Lys His Phe Pro Ser Lys Ser Asp Ser 100

Val Arg Ser Gln Trp Tyr Lys Lys Leu Glu Gly Thr Asn Glu Asn Phe 120 125

Ile Lys Leu Ala Asp Lys Pro Arg Ile Glu Asp Gly Gln Leu Gln Gln 135 Asn Ile Leu Arg Ile Leu Tyr Asn Gly Tyr Pro Asn Asn Arg Asn Gly 150 155 Ile Met Lys Gly Ile Asp Pro Leu Asn Ala Ile Leu Val Thr Gln Asn 165 170 Ala Ile Trp Tyr Thr Asp Ser Ala Gln Ile Asn Pro Asp Glu Ser Phe 185 Lys Thr Glu Ala Arg Ser Asn Gly Ile Asn Asp Gln Gln Leu Gly Leu Met Arg Lys Ala Leu Lys Glu Leu Ile Asp Pro Asn Leu Gly Ser Lys 215 220 Tyr Ser Asn Lys Thr Pro Ser Gly Tyr Arg Leu Asn Val Phe Glu Ser 225 230 235 His Asp Lys Pro Phe Gln Asn Leu Leu Ser Ala Glu Tyr Val Pro Asp 245 250 Thr Pro Pro Lys Pro Gly Glu Glu Pro Pro Ala Lys Thr Glu Lys Thr Ser Val Ile Ile Arg Lys Tyr Ala Glu Gly Asp Ser Lys Leu Leu Glu 275 Gly Ala Thr Leu Lys Leu Ser Gln Ile Glu Gly Ser Gly Phe Gln Glu 295 Lys Asp Phe Gln Ser Asn Ser Leu Gly Glu Thr Val Glu Leu Pro Asn 305 310 315 Gly Thr Tyr Thr Leu Thr Glu Thr Ser Ser Pro Asp Gly Tyr Lys Ile Ala Glu Pro Ile Lys Phe Arg Val Glu Asn Lys Lys Val Phe Ile Val 345 Gln Lys Asp Gly Ser Gln Val Glu Asn Pro Asn Lys Glu Val Ala Glu Pro Tyr Ser Val Glu Ala Tyr Asn Asp Phe Met Asp Glu Glu Val Leu Ser Gly Phe Thr Pro Tyr Gly Lys Phe Tyr Tyr Ala Thr Asn Lys Asp 385 390 395 Lys Ser Ser Gln Val Val Tyr Cys Phe Asn Ala Asp Leu His Ser Pro 405 Pro Asp Ser Tyr Asp Ser Gly Glu Thr Ile Asn Pro Asp Thr Ser Thr 420 425 430

Met Lys Glu Val Lys Tyr Thr His Thr Ala Gly Ser Asp Leu Phe Lys 440 Tyr Ala Leu Arg Pro Arg Asp Thr Asn Pro Glu Asp Phe Leu Lys His 455 Ile Lys Lys Val Ile Glu Lys Gly Tyr Lys Lys Lys Gly Asp Ser Tyr Asn Gly Leu Thr Glu Thr Gln Phe Arg Ala Ala Thr Gln Leu Ala Ile 485 490 Tyr Tyr Phe Thr Asp Ser Ala Asp Leu Lys Thr Leu Lys Thr Tyr Asn 505 Asn Gly Lys Gly Tyr His Gly Phe Glu Ser Met Asp Glu Lys Thr Leu 520 Ala Val Thr Lys Glu Leu Ile Thr Tyr Ala Gln Asn Gly Ser Ala Pro Gln Leu Thr Asn Leu Asp Phe Phe Val Pro Asn Asn Ser Lys Asp Gln

Ser Leu Ile Gly Thr Glu Cys His Pro Asp Asp Leu Val Asp Val Ile 570

Arg Met Glu Asp Lys Lys Gln Glu Val Ile Pro Val Thr His Ser Leu

Thr Val Lys Lys Thr Val Val Asp Glu Leu Gly Asp Lys Thr Lys Gly

Phe Gln Phe Glu Leu Glu Leu Lys Asp Lys Thr Gly Gln Pro Ile Val 615

Asn Thr Leu Lys Thr Asn Asn Gln Asp Leu Val Ala Lys Asp Gly Lys 630

Tyr Ser Phe Asn Leu Lys His Gly Asp Thr Ile Arg Ile Glu Gly Leu 650

Pro Thr Gly Tyr Ser Tyr Thr Leu Lys Glu Ala Glu Ala Lys Asp Tyr

Ile Val Thr Val Asp Asn Lys Val Ser Gln Glu Ala Gln Ser Val Gly

Lys Asp Ile Thr Glu Asp Lys Lys Val Thr Phe Glu Asn Arg Lys Asp 690 695 700

Leu Val Pro Pro Thr Gly Leu Thr Thr Asp Gly Ala Ile Tyr Leu Trp 705 710

Leu Leu Leu Val Pro Leu Gly Leu Leu Val Trp Leu Phe Gly Arg

<210> 5 <211> 509 <212> PRT <213> Streptococcus pyogenes <400> 5 Met Pro Tyr Val Lys Lys Lys Asp Ser Phe Leu Val Glu Thr Tyr Leu Glu Gln Ser Ile Arg Asp Lys Ser Glu Leu Val Leu Leu Phe 25 Lys Ser Pro Thr Ile Ile Phe Ser His Val Ala Lys Gln Thr Gly Leu Thr Ala Val Gln Leu Lys Tyr Tyr Cys Lys Glu Leu Asp Asp Phe Phe 50 55 Gly Asn Asn Leu Asp Thr Ile Lys Lys Gly Lys Ile Ile Cys Cys Phe Val Lys Pro Val Lys Glu Phe Tyr Leu His Gln Leu Tyr Asp Thr Ser 85

Thr Ile Leu Lys Leu Leu Val Phe Phe Ile Lys Asn Gly Thr Ser Ser

75

Gln Pro Leu Ile Lys Phe Ser Lys Lys Tyr Phe Leu Ser Ser Ser

Ala Tyr Arg Leu Arg Glu Ser Leu Ile Lys Leu Leu Arg Glu Phe Gly 130 140

Leu Arg Val Ser Lys Asn Thr Ile Val Gly Glu Glu Tyr Arg Ile Arg 145 150 155

Tyr Leu Ile Ala Met Leu Tyr Ser Lys Gly Phe Ile Val Ile Tyr Pro 165 . 170

Leu Asp His Leu Asp Asn Gln Ile Ile Tyr Arg Phe Leu Ser Gln Ser Ala Thr Asn Leu Arg Thr Ser Pro Trp Leu Glu Glu Pro Phe Ser Phe Tyr Asn Met Leu Leu Ala Leu Ser Trp Lys Arg His Gln Phe Ala Val Ser Ile Pro Gln Thr Arg Ile Phe Arg Gln Leu Lys Lys Leu Phe Ile Tyr Asp Cys Leu Thr Arg Ser Ser Arg Gln Val Ile Glu Asn Ala Phe Ser Leu Thr Phe Ser Gln Gly Asp Leu Asp Tyr Leu Phe Leu Ile Tyr Ile Thr Thr Asn Asn Ser Phe Ala Ser Leu Gln Trp Thr. Pro Gln His Ile Glu Thr Cys Cys His Ile Phe Glu Lys Asn Asp Thr Phe Arg Leu Leu Leu Glu Pro Ile Leu Lys Arg Leu Pro Gln Ile Asn His Ser Lys Gln Asp Leu Ile Lys Ala Leu Met Tyr Phe Ser Lys Ser Phe Leu Phe Asn Leu Gln His Phe Val Ile Glu Ile Pro Ser Phe Ser Leu Pro Thr Tyr Thr Gly Asn Ser Asn Leu Tyr Lys Ala Leu Lys Asn Ile Val Asn Gln Trp Leu Ala Gln Leu Pro Gly Lys Arg His Leu Asn Glu Lys His 

Leu Gln Leu Phe Ser Cys His Ile Glu Gln Ile Leu Lys Asn Lys Gln

	Pro Ala	a Leu	Thr	Val 405	Val	Leu	Ile	Ser	Ser 410	Asn	Phe	Ile	Asn	Ala 415	Lys		
	Leu Le	ı Thr	Asp 420	Thr	Ile	Pro	Arg	Tyr 425	Phe	Ser	Asp	Lys	Gly 430	Ile	His		
	Phe Ty	Ser 435	Phe	Tyr	Leu	Leu	Arg 440	Asp	Asp	Ile	Tyr	Gln 445	Ile	Pro	Ser		
	Leu Ly:		Asp	Val	Ile	Thr 455	His	Ser	Arg	Leu	Ile 460	Pro	Phe	Val	Lys		
	Asn Ası 465	Leu	Val	Lys	Gly 470	Val	Thr	Val	Ala	Glu 475	Phe	Ser	Phe	Asp	Lys 480		
	Pro Ası	o Tyr	Ser	Ile 485	Ala	Ser	Ile	Gln	Asn 490	Leu	Ile	Tyr	Gln	Leu 495	Lys		
	Asp Ly:	s Lys	Tyr 500	Gln	Asp	Phe	Leu	Asn 505	Glu	Gln	Leu	Gln					
<210> 6 <211> 19 <212> DNA <213> Streptococcus pyogenes																	
	<400> attttt	6 cctc	atgti	tgcta	a												19
	<210> <211> <212> <213>	7 19 DNA Stre	ptoco	occus	s pyc	ogene	es										
	<400> gtttaga		gttta	aatto	9												19
	<210><211><211><212><213>	8 18 DNA Stre	ptoc	occus	s pyd	ogene	es										
<400> 8 gccaataact gaggtagc								18									
	<210> <211>	9 19															

. .

<212> <213>	DNA Streptococcus pyogenes	
<400> ggcttt	9 tgct cttttaggt	19
<210> <211>	10 20	
<212> <213>	DNA Streptococcus pyogenes	
<400>	10	20
agttca	caag ttgtctactg	20
<210> <211>	11 20	
<212> <213>	DNA	
<400>	Streptococcus pyogenes 11	
	taga tagcaagctg	20
<210×	10	
<210> <211>	12 20	
<212> <213>	DNA Streptococcus pyogenes	
<400>	12 gcca gagttagatg	20
actaati	geca gageragatg	20
<210> <211>	13 18	
<212> <213>	DNA Streptococcus pyogenes	
<400>	13	
	cett ceactitg	18
<210>	14	
<211>	22	
<212> <213>		
<400>	14	
cactct	gtta aagaagtaac tg	22
<210>	15	
<211> <212>	18 DNA	
	Streptococcus pyogenes	

. .

<400>	15	18
Cicagag	gtca ctttctgg	10
<210><211><211><212><213>	16 19 DNA Streptococcus pyogenes	
<400> ggatttt	16 Egcc tactactta	19
<210> <211> <212> <213>	17 20 DNA Streptococcus pyogenes	
<400>	17	
gtggaat	cato taaaacagac	20
<210> <211> <212> <213>	18 23 DNA Streptococcus pyogenes	
<400>	18 :gga gactagaagt tta	23
<210> <211> <212> <213>	19 18 DNA Streptococcus pyogenes	
<400>	19	
agcaago	ccac tgatttac	18
<210> <211> <212> <213>	20 19 DNA Streptococcus pyogenes	
<400>	20	
tgcaaaa	agag ggataaaac	19
<210><211><211><212><213>	21 20 DNA Streptococcus pyogenes	
<400>	21	
	gtag acaacttgtg	20

<210> <211> <212>	22 20 DNA				
<213>	Streptococcus pyogenes				
<400>	22 aaag tagcttagca	20			
<210> <211> <212>	23 18 DNA				
<213>	Streptococcus pyogenes				
<400> atggaad	23 egtc atcacaac	18			
<210>	24				
<211> <212>	20 DNA				
<213>	Streptococcus pyogenes				
<400> cagatao	24 octa aaaataaacg	20			
<210> <211>	25 21				
	DNA Streptococcus pyogenes				
<400>	25				
gctgaaq	gaac aatcagtacc a	21			
<210> <211> <212>	26 24 DNA				
<213>	Streptococcus pyogenes				
<400> ttagtca	26 attt tttaaccett tacg	24			
<210>	27				
<211> <212> <213>	22 DNA Streptococcus pyogenes				
<400>	27	22			
ctttttactt attaagagat ga 22					
<210> <211>	28 18				

<212> <213>	DNA Streptococcus pyogenes	
<400> ctcgttt	28 caga aaatcttg	18
<210> <211> <212>	29 21 DNA	
<213>	Streptococcus pyogenes	
<400> aaaataa	29 atta aatcaatagc a	21
<210> <211> <212> <213>	30 17 DNA Streptococcus pyogenes	
<400> ccacaga	30 agat aatgtgt	17
<212>	31 36 DNA Escherichia coli	
<400> gacgato	31 etcg aggaggtaaa tgaagacgee aaaaae	36
	32 31 DNA Escherichia coli	
<400> gacgata	32 aagc ttttacaatt tggactttcc g	31